

**AMENDMENTS TO THE SPECIFICATION**

**Please replace the present title with the following rewritten title:**

AUTOMATED DATABASE ASSISTANCE USING A TELEPHONE FOR A SPEECH  
BASED OR TEXT BASED MULTIMEDIA COMMUNICATION MODE

**Please amend Summary of the Invention section beginning on page 4 of the  
Specification as follows:**

Summary of the Invention

To solve the above-described problem of being forced to use a human operator, it is an aspect of the present invention to provide Embodiments of the present invention provide a way to automatically search databases remotely using remote contact devices, irrespective of whether such remote contact devices are designed for text based communication or speech-based communication. According to a first aspect of the present invention there is thus provided An interface consistent with the first aspect of the present invention for remote user input for reading a database, the interface comprising has an automatic question unit operable to determine whether a user is connected via a voice-based or a text-based or a combined voice-text capable communication link.

Based on this determination, this automatic question unit, also, and for eliciting input from a user via either one of said voice- and or text based communication in accordance with said determination, This interface further has a speech recognition unit for recognizing human speech input, a data recognition unit for recognizing remote data input, and a query formulation

unit operable ~~both~~ for both formulating a searchable query from said recognized input and for prompting said automatic question unit to elicit further input from a user, ~~and wherein~~ This interface is associated with a database to search ~~said~~ this database using said recognized input. Preferably, the ~~said speech recognition unit~~ comprises a speech to text converter operable to convert said user input into query material for said database, and wherein said database comprises text entries.

Preferably, the ~~speech recognition unit~~ comprises a speech to phoneme converter operable to convert said user input into query material for said database, and wherein said database comprises entries made up of groups of one or more phonemes.

Preferably, the ~~speech recognition unit~~ comprises a combined speech to text converter and speech to phoneme converter, operable to convert said user input into query material for said database.

A preferred embodiment further comprises a confidence level determiner, associated with said speech recognition unit, said determiner being operable to determine a level of confidence from a plurality of possible confidence levels for a recognition instance of said speech recognition unit.

A preferred embodiment comprises an output unit for outputting a search result, wherein said output unit comprises speech and data output abilities and a selector for selecting an output ability to be used based on a user data receipt ability.

A preferred embodiment is interfaceable to a mobile telephone data facility.

~~Preferably, the mobile telephone data facility is any one of a group comprising WEB, WAP, plain text and SMS.~~

~~A preferred embodiment is interfaceable to a messaging service.~~

~~Preferably, the query formulation unit is operable to submit a recognized speech input as a query for search to said database and, in the event of failure to match, is further operable to prompt said question unit to ask a user to spell said input.~~

~~A preferred embodiment comprises associative linkage between associated names for widening searches on the basis of variations of input names.~~

~~Preferably, the database is a contact directory giving at least one contact point for each one of a plurality of searchable entries.~~

~~Preferably, for any searchable entry having more than one contact point, a hierarchy of contact point types is provided to define which of said contact points to output first.~~

~~Preferably, a contact point is usable as an input to obtain a searchable entry.~~

~~Preferably, the automatic voice question unit is programmable with a plurality of questions, and a number of said questions is determinable according to a size of the database.~~

~~Preferably, the questions are storable in a hierarchy which corresponds to a predetermined search strategy for the database, and wherein said automatic voice question unit is operable to stop asking questions as soon as sufficient information has been obtained to terminate a database search.~~

~~A preferred embodiment is operable to pass a user to a human operator when said hierarchy of questions is ended and a database search has not been terminated.~~

~~A preferred embodiment is operable to pass a user to a human operator when a user input is not translatable into material usable for searching said database.~~

~~A preferred embodiment further comprises a confidence level determiner, associated with said speech recognition unit, and operable to determine a level of confidence for a recognition instance of said speech recognition unit, said confidence level determiner being further operable to pass a user to a human operator when a user input is associated with a confidence level lower than a predetermined confidence threshold.~~

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~~A preferred embodiment comprises a switch for connecting a user to a contact point retrieved from said database.~~

~~A preferred embodiment comprises a data exchange mechanism operable to bring about data interactivity between said database and a remotely located user database.~~

~~A preferred embodiment is operable to insert an identification of a caller into a header of a message left by said caller.~~

~~Preferably, the contact point is a telephone number.~~

~~Preferably, the identification is any one of a group comprising a text string, a photograph an audio sequence and a video sequence.~~

~~Preferably, the database is searchable to retrieve a location and wherein said retrieved location is superimposable on one of a group comprising a map, a video and a photograph.~~

~~A preferred embodiment includes a graphical output unit operable to send said map to said user.~~

~~Preferably said map is in a location system operable to determine a current location of a user and which location system is further operable to trace a route from said current location to said retrieved location.~~

~~Preferably, the database comprises results fields including any one of a group comprising a text string field, a photograph field and a video sequence field.~~

~~Preferably, the question unit comprises a speech output operable to output questions in spoken form to users connected via speech enabled devices and a text output to output questions in text form to users connected via text enabled devices.~~

According ~~Furthermore, a location system consistent with to~~ a second aspect of the present invention ~~there is provided a location system is~~ connectable to a location database comprising ~~with~~ a geographic location data associated with personal identification data such that ~~said the~~ personal identification data is usable in search queries to obtain an associated location. The ~~location system further has which location system comprises~~ a positioner for determining a current position of an enquirer. This ~~location system can, and which is operable to receive said~~ location data from ~~said location the~~ database in response to a query involving ~~said personal~~ identification data. Moreover, the location system has, which location system further comprises a route determiner for determining a route from ~~said the~~ current position to ~~said the~~ desired location using ~~said~~ location data.

~~Preferably, the location database is a directory associating subscriber identification data with subscriber address data.~~

~~A preferred embodiment has a graphical output operable to output said route as a route on a map.~~

~~Preferably, the output is operable to output said route in real time.~~

~~A preferred embodiment has a combined voice and text output operable to determine whether a user is connected via voice capable or text capable communication and operable to output said route as a sequence of instructions in text and voice format in accordance with said determination.~~

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~~Preferably, the combined voice and text output is operable to output said sequence of instructions in a preselected language.~~

~~Preferably, the sequence in said preselected language is obtainable from a corresponding sequence in a base language by real time automatic translation.~~

~~Preferably, the location data comprises map co-ordinates.~~

~~Preferably, the personal identification data comprises street address data and wherein said positioner is operable to translate street address data into corresponding map co-ordinates.~~

Moreover, a method consistent with According to a third aspect of the present invention there is provided an interfacing method for remote user input for reading a database, the method comprising determining, as a connection type, whether a user is connected via a voice-based or a text-based or a combined voice-text capable communication link; then, eliciting input from a user via either one of voice and or text based communication according to said the connection type. Then the speech or text input is recognized human speech input to said interface, and recognizing remote data input to said interface, formulating a searchable query from said

recognized input is formulated. Next, the user is prompted ~~prompting said user~~ via automatic questioning in order to elicit further user input from a user unless a query was sufficient for searching said the database has been formulated. Finally, and database is searched ing a database using said the query.

~~A preferred embodiment comprises determining whether an ambiguous answer is received from said database, and~~

~~if an ambiguous answer is received then prompting said automatic question unit to elicit further input from a user until a more sufficient query has been formulated.~~

~~Finally, a method consistent with According to a fourth aspect of the present invention provides there is provided a method of remotely reading a database via a remote communication device having a communication mode, comprising: entering a query request via said remote communication device in said a communication mode, sending mode, sending said the query request to a communication interface in said this communication mode, receiving instructions in said this communication mode for entering query items to form a database search query, sending said the query items in said this communication mode for said interface to form a query for interrogating said database in a database interrogation mode to produce a query result in said database interrogation mode for translation by said the interface into said this communication mode, and receiving said the result at said the remote communication device from said an interface in said this communication mode.~~

~~Preferably, the communication mode is a mode of voice communication.~~

~~Alternatively, the communication mode may be a mode of text communication.~~

~~The database interrogation mode may be a mode of text communication, or a mode of communicating using phonemes.~~

**Please amend last paragraph beginning on page 11 as follows:**

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For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, purely by way of example, to the accompanying drawings, in which:

Fig. 1 is a block diagram showing an automatic interface between a remote user and a database, which interface is operable to search a database using queries formulated on the basis of information gathered over a telephony link from a remote user;

Fig. 2 is a flow chart showing operation of the interface of Fig. 1;

Fig. 3 is a flow chart showing in greater detail the selection of ~~or~~ a further question in the operation of Fig. 2;

Fig. 4 is a flow chart showing in greater detail the selection of a further question in the event of low probability recognition of user input; and

Fig. 5 is a block diagram of an architecture for supporting automatic directory assistance, in accordance with a preferred embodiment of the present invention.

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**Please amend last paragraph on page 24 as follows:**

Preferably, if the directory is sufficiently large, (several million entries) such that even uncommon family names are likely to appear several times, the street address may be asked as part of the initial information prior to beginning the search. On the other hand, if the directory is relatively small, (a few hundred thousand entries) then only the name and the postcode is preferably asked.

**Please amend last paragraph beginning on page 27 as follows:**

In a further preferred embodiment, a database of the kind described above may be associated with a location system. There are currently available location systems which comprise street maps and can be incorporated into vehicles to guide a user to a destination. Such systems may include GPS operability so that the current location of the user can be compared to a desired location so as to give the user a route to the desired location. In the present embodiment, the system is combined with a database such that the enquirer gives the name or other identification information, the database obtains an address and the location system advises on a best route to reach the address. Advice on the best route may be given as spoken instructions or as written data or as a path displayed on a map screen as appropriate for the device through which the enquiry is made or to which the enquiry result is sent. Preferably, the same spoken/written instructions are stored in several languages and the user is able to select the desired language. Alternatively, upon user selecting the desired language, instructions are translated from the base language into this desired language.

**Please amend first paragraph beginning on page 28 as follows:**

Reference is now made to Fig. 2, which is a flow diagram showing in greater detail the way in which an incoming user enquiry is processed to produce a query for the database and a usable output for the user. In Fig. 2, in an initial stage S10 data input is received from the user. The system determines whether the incoming data is text or speech in a decision stage S12. If the data is found to be speech then it is preferably converted to text in a conversion stage S14. As discussed above the speech may alternatively or additionally be converted into phonemes. *AS* The resulting text or phonemes may then be formulated into a query in a stage S16. The number of fields are then used to determine, in determination stage S17, whether the query is sufficiently strong to obtain a useful result. If not, further data is obtained by asking a further question of the enquirer in a stage S18. If the data is judged to be sufficient then it is used to query the database in stage S20. If the database does not give a sufficient output in determination stage S22, then the procedure continues to S18 and asks the user a further question, preferably judiciously chosen to enable the system to discriminate between multiple search results. Once a sufficient answer is available the system outputs an answer to the user in output stage S24.

**Please amend last paragraph beginning on page 30 as follows:**

Reference is now made to Fig. 5, which is a block diagram of an directory assistance architecture 40 for supporting the automatic directory assistance system, in accordance with a preferred embodiment of the present invention. The block diagram is by way of an example only and illustrates an embodiment of the invention applied specifically to a node of a high speed

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backbone network 46, the node using E1/T1 and SS7 signaling. In Fig. 5, the architecture 40 comprises a standard call center 42 fronted by a front end unit 44, preferably a directory assistance telephony and RM server 44 attached directly to the high speed backbone network (HSBN) 46 of the telephone network. Also connected to the HSBN are a call control signaling (CCS) unit 48, a directory assistance interface server 50, a directory access administration server 52, and an administrative LAN 54 to which are attached interface servers to SMS 56 and to WAP 58 and the subscriber directory 60. An alarm 62 is also attached to the administrative LAN 54 and preferably administers all the alarms on the system.

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